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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/675,072 | 09/30/2003 | Yumin Tao | 1288R | 5528 |

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| EXAMINER | |
|---|---|
| COLLINS, CYNTHIA E | |
| **ART UNIT** | **PAPER NUMBER** |
| 1638 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 01/19/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/675,072 | TAO ET AL. | |
| | Examiner | Art Unit | |
| | Cynthia Collins | 1638 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12 July 2006 and 25 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) *1-22 and 24-47* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23 and 48-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

The Amendments filed July 12, 2006 and October 25, 2006 have been entered.

Claims 1-22 and 24-47 are withdrawn.

Claim 23 is currently amended.

Claims 48-51 are new.

Claims 1-51 are pending.

Claims 23 and 48-51 are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

### *Claim Rejections - 35 USC § 112*

Claim 23 remains rejected, and claims 48-51 are rejected, under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, for the reasons of record set forth in the office action mailed April 17, 2006.

Applicants' arguments filed July 12, 2006 and October 25, 2006 have been fully considered but they are not persuasive.

Applicants traverse the rejection and note that enablement is not precluded by the necessity for some experimentation, so long as the experimentation needed to practice the invention is not undue, and that a considerable amount of experimentation is permissible if it is

merely routine or if the specification provides a reasonable amount of guidance as to how the experimentation should proceed. Applicants also note that in the biotechnological arts, screening of numerous constructs and transformants is routine and typical. With respect to the cited reference of Sandler et al. (1988) and van der Krol et al. (1990), Applicants note that both references do report successful downregulation of the target genes, and Applicants respectfully submit that identification of the most effective constructs is within the scope of routine experimentation. (reply page 4)

The Examiner maintains that the success of Sandler et al. and van der Krol et al. depended on their determination of the type of components to use and their arrangement within the constructs, for each respective gene sequence (antisense transcripts downstream from the Cla I site for nopaline synthase gene sequence, and antisense transcripts corresponding to the full length CHS cDNA and CHS sequences encoding half-length or quarter-length RNA complementary to the 3' half of the CHS mRNA for the chalcone synthase gene). In the instant case the specification provides no guidance with respect to what part(s) of SEQ ID NO:1, if any, can be used to induce apomixis in a plant. In view of the unpredictability of downregulating the expression of a particular gene in plants and the multiplicity of variables involved, it cannot be ascertained whether the identification of constructs comprising SEQ ID NO:1 or fragments thereof that effectively induce apomixis in a plant is within the scope of routine experimentation.

Applicants also point out that the priority date of the pending application is December 2000, ten years after the van der Krol reference published, and Applicants submit that the art had advanced considerably between 1990 and 2000. Applicants provide the following pre-filing-date

examples of successful downregulation by antisense, sense suppression, ribozyme, and dominant negative inhibition, respectively: Muller et al., Maize Genetics Cooperative Newsletter 70:25 (1996). Chalcone synthase antisense expression in transgenic maize leads to white pollen phenotype. Terada et al., Plant and Cell Physiology 41(7):881-888 (July 2000). Antisense waxy genes with highly active promoters effectively suppress Waxy gene expression in transgenic rice. Vailhe et al., Journal of the Science of Food and Agriculture 76(4):505-514 (1998). Effect of downregulation of cinnamyl alcohol dehydrogenase on cell wall composition and on degradability of tobacco stems. (antisense). Tsai et al., Plant Physiology 117(1):101-112 (1998). Suppression of O-methyltransferase gene by homologous sense transgene in quaking aspen causes red-brown wood phenotypes. Merlo et al., Plant Cell 10(10):1603-1621 (1998). Ribozymes targeted to stearoyl-ACP delta 9 desaturase mRNA produce heritable increases of stearic acid in transgenic maize leaves. Unger et al., Plant Cell 5(8):831-841 (1993). Dominant negative mutants of Opaque2 suppress transactivation of a 22kD zein promoter by Opaque2 in maize endosperm cells. Other examples are cited in the specification; see especially page 18, line 28, through page 19, line 16. Applicants also respectfully respond that the findings of Waterhouse et al. cited by the Examiner may be seen as providing guidance for the preparation and use of antisense constructs, effectively reducing the number of potential constructs to be tested and the need for experimentation. (reply pages 4-5)

With respect to Applicants observation that the van der Krol reference was published ten years before the priority date of the pending application, the Examiner notes that van der Krol was cited as being exemplary of a type of experimental variable (components to use and their arrangement within gene silencing constructs) that can affect the ability of a construct to

suppress gene expression. This variable cannot be altered by the passage of time, as this variable is a function of and inherent to the compositions at issue (specific antisense polynucleotide sequences and the particular gene whose expression is suppressed).

With respect to the references cited by Applicant, and Waterhouse et al. previously cited by the Examiner, the Examiner maintains that none of these reference provide the type of guidance necessary to enable the claimed invention, as none of the cited references pertain to the use of SEQ ID NO:1 or fragments thereof to induce apomixis in plants. The outstanding rejection was not predicated on a failure to provide general guidance with respect to techniques that are known to and within the abilities of one skilled in the art. The outstanding rejection was predicated on a failure to provide specific guidance with respect to the type of components to use in a CHD-DR construct or their arrangement within the construct, or the requisite degree of homology between the construct components and the CHD gene to be downregulated, or the presence or absence of other homologous CHD genes in the genome of the target cell, or the level at which CHD gene expression is regulated, or other relevant variables, such that a CHD-DR construct will induce apomixis in plants. None of these references provide specific guidance with respect to the type of components to use in a construct comprising SEQ ID NO:1 or fragments thereof, or their arrangement within the construct, or the requisite degree of homology required between SEQ ID NO:1 or fragments thereof and the CHD gene to be downregulated, or the presence or absence of other homologous CHD genes in the genome of the target cell, or the level at which CHD gene expression is regulated, or other relevant variables, such that a construct comprising SEQ ID NO:1 or fragments thereof, will induce apomixis in plants.

With respect to Temple et al. cited by the Examiner, Applicants respectfully respond that the conclusion that glutamine synthetase synthesis is unaffected by down-regulation of a member of a multigene family encoding glutamine synthetase is not determinative of efficacy of the constructs disclosed in the present application. (reply pages 5-6)

The Examiner maintains that while the conclusion that glutamine synthetase synthesis is unaffected by down-regulation of a member of a multigene family encoding glutamine synthetase may not be determinative of efficacy of the constructs disclosed in the present application, the level at which the expression of a CHD gene corresponding to SEQ ID NO:1 is regulated could be determinative of efficacy of the disclosed constructs, as the ability of a construct to suppress gene expression depends in part on the level at which the expression of the gene is regulated. In this regard it is noted that neither the specification nor the prior art provide guidance with regard to this variable.

With respect to Eissenberg cited by the Examiner, Applicants maintain that the amendment of the claims obviates this objection. (reply page 6)

The Examiner maintains that the amendment of the claims does not obviate this objection, as the specification provides no guidance with respect to whether or how the suppression of a CHD gene corresponding to SEQ ID NO:1 could induce apomixis in plants.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Remarks***

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cynthia Collins
Primary Examiner
Art Unit 1638

CC

Cynthia Collins
1/5/07